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TORREYA

January, 1913.

Vol. 13 No. 1

PRIZE ESSAY ON THE LOCAL FLORA

The editorial board of the Club announces the award of prizes offered in March, 1912, for the best popular article written by an amateur, on some feature of the vegetation of our local flora range.

The first prize goes to Mrs. Elmer G. Sammis, of Brooklyn, N. Y., for the essay "A Vacation among the Mosses," printed herewith. The second prize has been awarded to Miss. E. M. Kittredge, of Spring Valley, N. Y., for the essay "Some Trees and Shrubs of Rockland Co.," which will be printed in TORREYA for February. The third prize has been awarded to Mr. John McCallum, of Richmond Hill, L. I., for his article "A Lesson from Common Plants." The board regrets that of the other essays submitted none are of sufficient merit to warrant the awarding of additional prizes.—N. T.

A VACATION AMONG THE MOSSES

BY EDITH M. SAMMIS

"Mosses and lichens! What of these? Meek creatures! The first mercy of the earth, veiling with hushed softness its dintless rocks. Creatures full of pity! Covering with strange and tender honor the scarred disgrace of ruin, laying quiet finger on the trembling stones to teach them rest."

It is not often that scientific exactness and literary beauty are so happily combined as Ruskin has combined them in his description of the mosses. Meek creatures they are, with their creeping, or erect, habit of growth. Among the oldest of plants, they are indeed the first mercy of the earth, succeeding the liverworts which were probably the first land plants. How their hushed softness mellows the angles and edges of the most

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jagged rock! Creatures full of pity! What unlovely sights of decaying stumps and logs they tenderly beautify with their

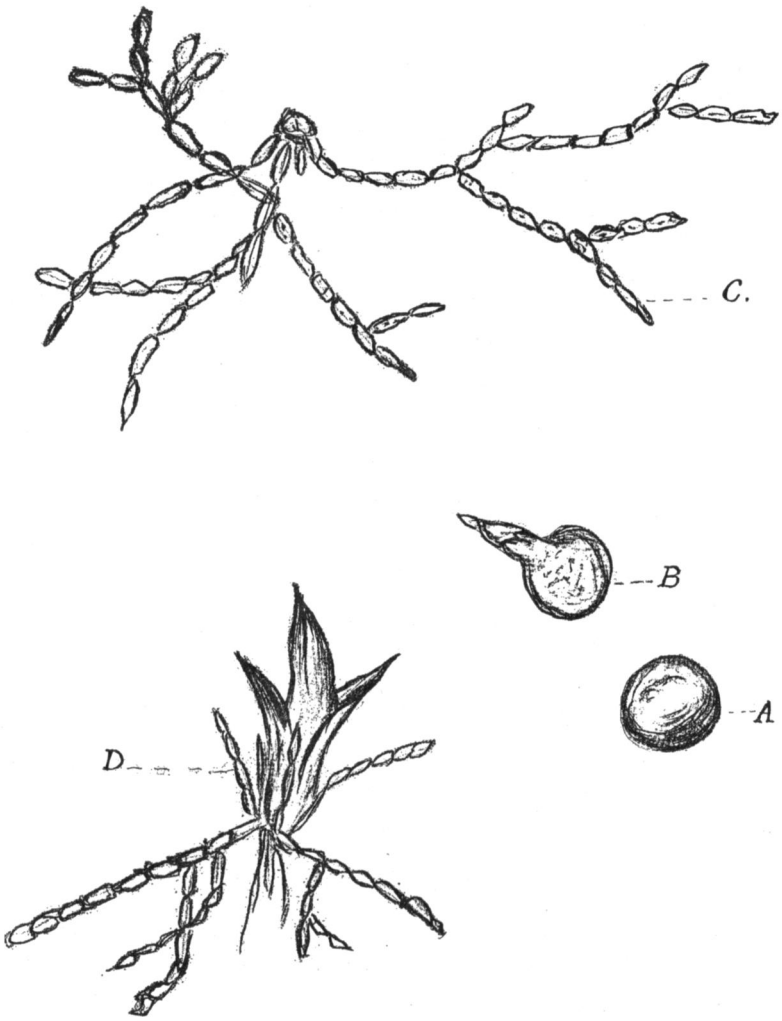

FIG. 1. *A*, spore; *B*, germinating spore; *C*, protonema; *D*, bud. All much magnified.

mysterious traceries! How much disintegration they retard, if not prevent, with the hold of their quiet fingers!

What important part mosses play in the making of the beauty

of a landscape is apparent when one takes a walk among the haunts of mosses during a drought, when rocks and logs and soil are dry and brown and bare because the mosses have folded up their tiny leaves close to the stems to retard evaporation. Take the same walk after a soaking rain, and the leaves are unfolded and spread, and stones, trees and old stumps are radiant in living green. This habit of the mosses of taking up and retaining moisture makes them valuable not only as creatures of beauty but of utility in the economy of nature. "To them, slow-fingered, constant-hearted, has been intrusted the weaving of the dark eternal tapestries of the hills."

And how common they are! In all countries, at all altitudes, in swamps and on dry wastes and hillsides, on soil and submerged in fresh water, they find their quiet way. But they halt at the seashore. Seaweeds are not mosses.

And yet, because they are so small and meek, they have been overlooked by the wayfaring man who thinks of moss as something green and beautiful but too small to suggest the astonishing number of species,—several hundred to be found in the United States alone. "Nature," says some one, "made ferns as leaves to show what she could do in that line." Just a superficial microscopic examination suggests that nature must have made mosses to show what she could do with plants in miniature, for their tiny leaves are as wonderfully shaped, the margins often serrated, and their capsules are as exquisitely molded and carved and painted as are the leaves and fruits of the better known, larger and statelier seed-bearing plants.

While it requires the use of a microscope to make any extensive study of the mosses, many species can be identified by the aid of a simple hand-lens, and the species mentioned in this article can be recognized by one having ordinarily good eyesight. How much it adds to walks through mountain woods to be able to meet as friends even twenty mosses conspicuous for size and beauty, only he who has that delightful acquaintance can appreciate.

Beginners are apt to confuse mosses and lichens and hepatics, calling them all mosses because they are frequently found

growing together and resemble each other more or less. For a knowledge enabling one to distinguish these plants one of the popular books on mosses and their allies will be found helpful and interesting.

Mosses are among the simplest of plants in their development and mode of reproduction. They are spore-bearing plants like the ferns and club mosses, lower in rank then these but higher than the hepatics. The spores have the appearance of green or brownish green powder and they, too, form an interesting study under the microscope. Falling into a favorable environment, the spores germinate, producing what the microscope reveals as a branching thread-like mass, but to the naked eye presents the appearance of the green scum on a stagnant pond.

From this protonema (meaning first thread), there are developed little buds which become the gametophyte or sexual plant after the fertilization of the sporophyte or spore-bearing plant. The gametophyte is usually terminated at the apex by a rosette of leaves. The sporophyte consists of the seta or stalk and the capsule containing the spores. The capsule often has a lid or operculum and opens when the spores are matured to permit their escape. Just under the operculum and surrounding the top of the capsule is very often found the peristome, a ring of teeth of different forms in the various species, which by their contraction and expansion and lifting and lowering, according to the temperature and humidity and the maturity of the spores, favor or retard their escape,—an example of nature's extreme care in fostering the propagation of her creatures. The capsule, too, is usually completely covered or topped by a cap or calyptra which frequently falls off at the time of maturity. The common haircap moss has a most conspicuous hairy cap and its peristome, because of its size and beauty, will furnish the beginner a fine specimen for admiration and study. Mosses have no true roots but many possess hair-like processes which resemble roots and are called rhizoids.

Figure 1 shows a spore (*A*) and a germinating spore (*B*), protonema (*C*) and a bud (*D*). All are much magnified. Figure 2 shows a sporophyte (*E*) a capsule with lid closed (*F*) another

with lid removed (*H*) to allow the escape of the spores, a peristome (*J*) in dry weather; (*K*) the same in wet weather or before the maturity of the spores. Figure 3 shows a capsule with calyptra removed. Figure 4 shows a male plant with rosette of leaves at the summit. Figure 5 is an attempt to show the beauty of

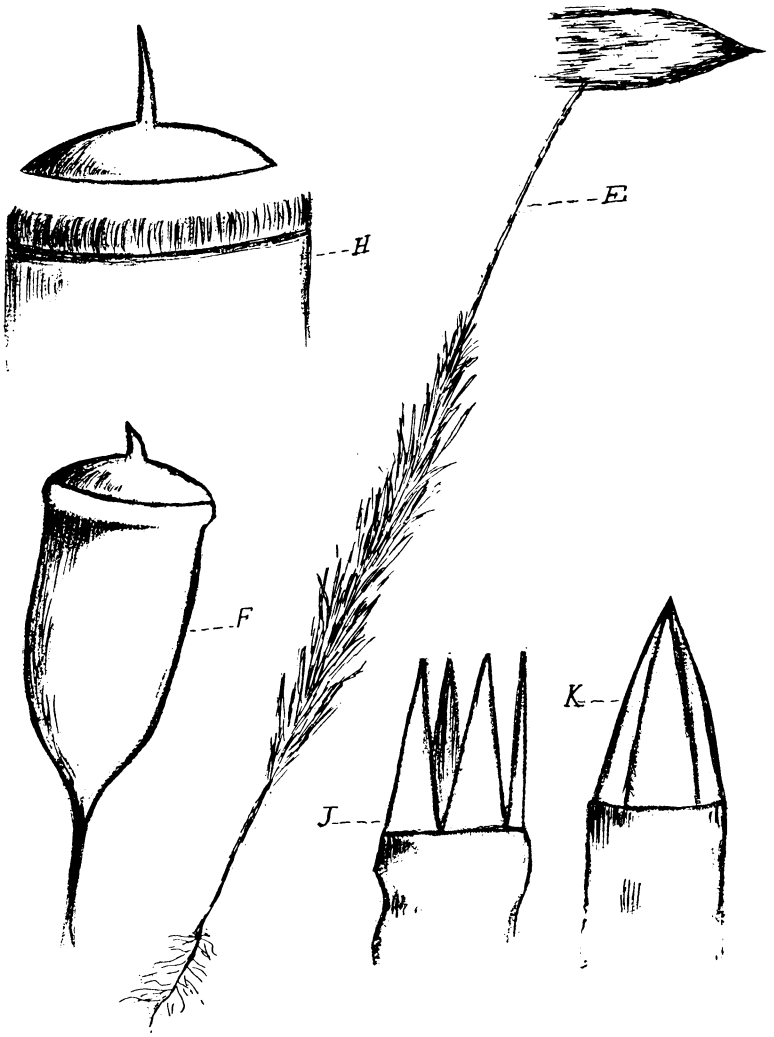

FIG. 2. *E*, sporophyte; *F*, capsule with lid closed; *H*, the same, with lid removed; *J*, peristome in dry weather; *K*, the same in wet weather, or before the maturity of the spores.

the peristome of the common haircap moss. The teeth are sixty-four in number and short, with the tips attached to a membrane which covers the top of the capsule. In wet weather or before maturity, the teeth fit in closely together preventing the escape of the spores; in dry weather they shrink as does also the membrane, by which process the shrunken teeth are drawn downward and inward thus producing apertures through which the spores are shaken by the winds or passing insects or birds. No verbal description can do justice to the delicate ornamentation of the minute teeth.

As mosses are generally so small their study and differentiation into species has been left to the bryologist, the man of science; and therefore few of them, except the larger or more beautiful species have common or local names; and this and the necessity for a lens has not tended to make their study popular.

However, when nature finds it wise to send downpours of rain during one's vacation in the Catskill Mountains, when golf and tennis and motoring are out of the question, a pair of overshoes, a rain coat and an umbrella, a sound body and a hopeful spirit, and just the little knowledge given above will take one forth where the mosses are luxuriating. Just step outside the door and close by the path is a great cluster of feathery green with numberless little wheat grains, apparently, stuck up on hair-like stalks. Pluck two or three stalks and immediately you will recognize the haircap, *Polytrichum commune.* It is erect and one of the largest of the native mosses and common everywhere, in Asia, Europe and North America, and its large hairy cap easily leads to its identity. Like most mosses its appearance changes greatly with the moisture or dryness of the air. The leaves being long, their folding and unfolding effects a marked change in the plants. If you grasp a handful of the feathery stems in moist weather you will not wonder at the information that these mosses have been put to use for stuffing pillows and beds in Lapland, and again, if you pluck some of the dry tough stems during a drought, it will seem quite credible that this same moss is used for making brooms in some countries. Another species is *Polytrichum strictum* which has very long leaves and is sometimes five or six inches in height.

By this time we have become so interested in our newly found acquaintance, whom we have passed by so many years with scarcely a glance, that we are ready to brave the weather and between showers seek a familiar path in the woods. Who would imagine that dead, decaying old logs could be made such objects of beauty? It is nature's pall of her most exquisite

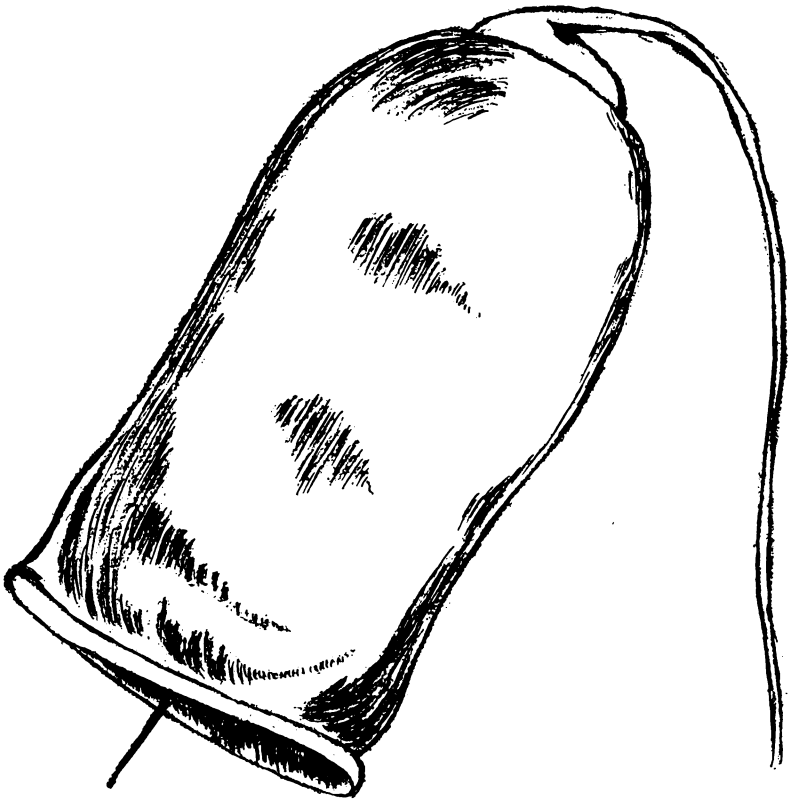

FIG. 3. Capsule, with calyptra removed.

embroidery. Looking closer, we shall find more than one species of the great *Hypnum* family, rather difficult to identify as to species, but we shall have no trouble in determining a few of them. The Hypnums are all prostrate or creeping and form more or less dense mats on soil, rotten wood or stones, and sometimes are found submerged. One of the most common is the

beautiful *Hypnum imponens*, prostrate, of a bright green color, the little plants interlacing and overlapping each other as they cover the fallen logs and decaying stumps and bare stones. The plants resemble tiny plumes. Especially is this true of *Hypnum Crista-castrensis*, somewhat rarer than *imponens* and more faithfully plume-like in appearance. *H. Crista-castrensis* of the Catskills loves especially the old rocks of a hemlock woods where it thrives luxuriantly, often covering with its rich yellow-green plumes a great old needle-strewn rock. *Hypnum uncinatum* or hooked-moss can be readily identified by the curving leaves which form little hooks at the ends of the branches.

The most unseeing eye could scarcely fail to observe the so-called fern-mosses because they are so fernlike in form. They spread their delicate tracery over stones and soil and decaying wood. They are the dainty lace of the woods. There are several species, among the most common being *Thuidium delicatulum*. The mountain fern moss, *Hylocomium proliferum*, is larger and more vigorous, the new plant springing from the upper side of the plant of the previous year. For its best development it requires moist rocks in shady woods where it forms magnificent loosely-woven masses of its feathery gracefully-curving shoots. The fern mosses of the Catskills have not within a dozen years, at least, been very prolific in fruit.

Now as the rain ceases let us walk through the woods where it is higher and drier, and we shall come upon our staunch little friend, the shaggy moss, *Hylocomium triquetrum*. Easy, good-natured little philosopher, it grows in most any environment, but thrives best on soil in moist woods. Its stem is erect and rigid and, as you grasp it, you will note its elasticity which has brought it to the humble but necessary service of a filler in packing fine china.

A moss enthusiast next suggests that we take a walk through Mary's Glen and follow the gentle, softly-murmuring brook along its way through the great old rock-strewn forest. There must be beautiful mosses here we imagine, although we have not noticed them in previous walks. Mosses! Yes, fairy forests

of them growing along the bank of the brook,—tiny trees under which the fairies surely sport and revel. This is the handsome tree-moss, *Climacium americanum*. It cannot be mistaken because of its wonderful tree-like form. It rarely fruits but the little tree-like shoots spring from underground stems.

As we follow the mountain brook looking for *Climacium*, we find anchored to the stones and with their branches, sometimes a foot long, submerged and spread along in the flowing water, one, or perhaps two, species of watermoss, *Fontinalis gigantea* with its strong, three-angled stems and large leaves, and *Fontinalis dalecarlica* with its tough hair-like branches and its capsules found on the older branches which have shed the leaves. The writer has never found *gigantea* in fruit.

Among the mosses which prefer dripping rocks for their best development is *Plagiothecium denticulatum*, of a brilliant green, with the leaves arranged evenly on opposite sides of the stem and forming flat compact mats of green, shining through the dripping water. A great old gray rock three thousand feet above the sea on North Mountain is a sight never to be forgotten with its ancient sides covered with a drapery of *Plagiothecium*, its bright green softened most artistically with the soft gray of spreading lichens.

Moss hunters form the habit of looking closely toward the ground, but many mosses seek out the living tree for their habitat. Such is *Neckera pennata*, found quite high on trees, sometimes as high as

FIG. 4. Male plant, with rosette of leaves at the summit.

fifty feet. The branches are flattened and curve outward and downward, and the capsules nestle on the under side hidden by the peculiarly waved leaves of a grayish green.

The name, Mossy Glen, gives wonderful scope for the imagination, in the language of Anne of Green Gables, but a trip

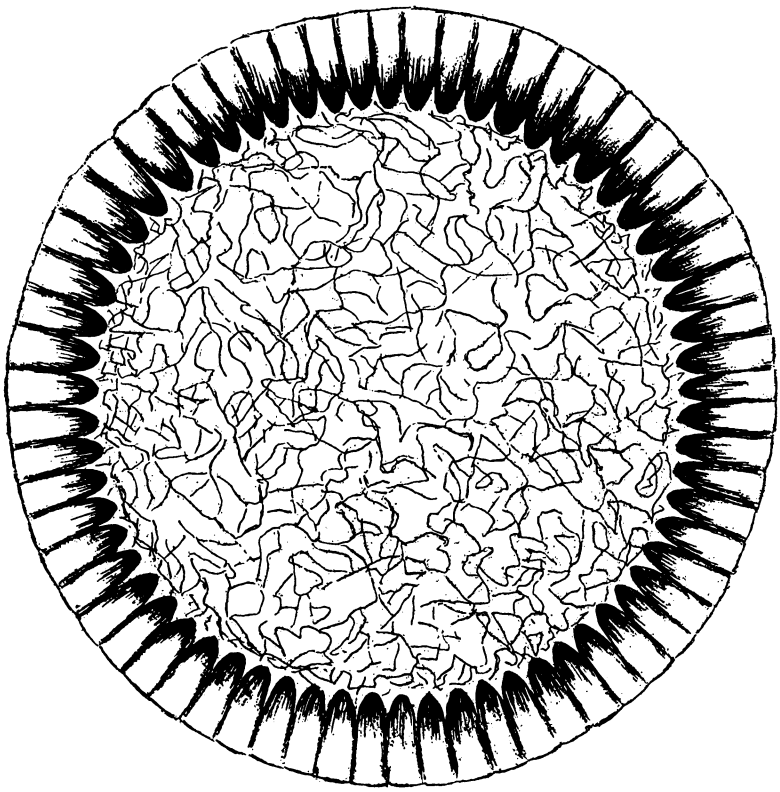

FIG. 5. Peristome of Haircap moss.

there surpasses our wildest dreams in the delights it offers to the moss student. The mountain stream comes tumbling down from the heights, dashing over the rocks, spreading out into mirror-like pools to rest and falling over precipices in numberless cascades, scattering its spray over rocks and leaves and branches that impede its progress. Here beside, and in the midst of, this turbulent fitful stream, dwell, in the moist shady depths of

the forest, members of the *Mnium* family. They are particularly noticeable for the leaf development. The leaves are often quite large and more nearly resemble the leaves of seed-bearing plants. A plant of the species *Mnium affine ciliare* is a faithful copy, in miniature, of a compound leaf of a seed-bearing plant, with numerous leaflets.

Out in Wildcat Ravine, just where the brook spreads itself out quietly upon the top of the cliff before it takes its downward plunge over the mountain side, we shall find the large-leaved *Mnium punctatum elatum.* Its leaves are especially large and have a distinct mid-vein. It prefers the ooze on partly submerged rocks. The male heads of the *Mnium* and those bearing the capsules are very frequently found mixed. Beginners may mistake the two for separate species.

Our book has told us about the *Bryum* family, much resembling the Mniums, and of the difficulty of identifying them without a microscope. But there is a giant *Bryum* which seems easy to recognize if we can find it. Its favorite haunt is secluded from human eye in rich moist loam on shady, sheltered, almost inaccessible cliffs. We take a scramble down over the rocky sides of Round Top and behold! here it is. The rosettes of leaves at the top of the naked stems, looking like perfect little green roses, are arranged, as only nature can arrange her creations, in surpassingly beautiful masses. The *Bryum roseum* fruits infrequently but sends forth new shoots from underground stems called stolons.

In your mountain walks, if you come upon a rock of conglomerate, a fragment of an old seabeach now resting quietly in the shade, look closer and you will be apt to find in the niches of its pebbly surface, bunches or tufts of what appears like green wool. This is the woolly moss or *Bartramia pomiformis.* It gets its last name from the fact that its capsules are quite apple-like in form.

Nature makes haste to hide the bare blackness of burned-over ground. How soon we notice *Epilobium*, the fire-weed, with its racemes of conspicuous purple flowers standing like sentinels where a fire has raged. But if we get closer to the blackened

soil we shall find also, if it be fairly moist, a common liverwort, *Marchantia*, growing sociably with the cord-moss, *Funaria hygrometrica* with its reddish brown twisted seta. This twisting of the seta is more or less common among many mosses but is most pronounced in *Funaria*. In wet weather *Funaria* coils up its seta like a spring and as the air becomes dry it untwists with a snap, hurling the spores from the capsules to be scattered far and wide.*

Mossy Path on South Mountain is a more or less swampy pine woods with the ground covered with several years' layers of pine needles. This is a favorite haunt of the white or cushion moss, *Leucobryum glaucum*. Its name fits it admirably, as it grows packed together in cushion-like mats, with the older and taller plants in the middle and the younger ones added gradually to the circumference. In color it is pale green when the environment is favorable as to moisture. It is almost white when it finds itself in quite dry places. It fruits infrequently except in very wet surroundings.

Of the 248 species of peat moss growing in abundant supplies nearly throughout the world, the beginner will be proud to identify three, found in swampy spots in the Catskills. It is the moss that forms the peat bogs of Ireland and grows in great quantities in the United States. The great power and capacity of peat moss for absorbing moisture makes it valuable in preventing floods. The plants keep growing from the top and die below, and are saved from utter decay and disintegration by some peculiar preservative quality in the ooze in which they grow. In color the peat mosses are grayish green, occasionally bright green or reddish-brown, and *Sphagnum acutifolium* is sometimes pinkish at the top. The spores are freed from the capsule by a miniature explosion which is explained in different ways but which is sure to occur only when the spores are matured and the weather conditions favorably dry. The three species best known and most easily identified are named for the leaf peculiarities. *Sphagnum acutifolium*

* This is true also in *Tetraphis* (see Fig. 2, *J* and *K*). In Dicranaceae, Fissidentaceae, and *Ceratodon* the reverse is true, as the spores are released only in a moist atmosphere. See Goebel, K., Organography of Plants 2: 163. 1905.—Ed.

shows acute leaves, *S. squarrosum* has acute leaves with spreading tips which stand out at an angle from the stem and *S. cymbifolium* has a boat-shaped leaf with a stouter stem. The floor of the woods near the summit of North Mountain is carpeted with a magnificent rug of the pink-topped *Sphagnum acutifolium*, a wonder of beauty to the eye and a solace and comfort to the tired feet of those who have come up with much toil, happily expectant of a view just beyond.

Most mosses lose much of their beauty by the drying necessary for their preservation in herbaria, but most of the twenty or more species mentioned in this article, if carefully pressed, make very beautiful mounts, and if kept from the light will retain their colors almost indefinitely. They can be artistically arranged also in passe-partout style and make unique and much-prized gifts in this form. A dozen specimens arranged on white paper, four by six inches, with a cover of birch bark, with their names and habitat and Ruskin's quotation which opens this article, make a novel and refreshing remembrance for an invalid or shut-in.

If an amateur may venture a suggestion to anyone looking for rest and relaxation from the cares and perplexities of life, and a change from the ordinary recreations of vacation seasons, it would be, "Begin to play with the mosses." You will be rested and refreshed and your powers of observation will be vastly quickened and increased, and a field of such wonder and beauty will be opened to your entranced vision that you will find a new and deeper meaning in Mrs. Browning's lines,

> "Earth's crammed with heaven,
> And every common bush afire with God,
> But only he who sees takes off his shoes."

BROOKLYN, N. Y.